Part I: (due at the beginning of class Friday, February 16)

Read the first two pages (the front and back of the first piece of paper) of the Simpson's Rule handout and answer the questions therein for your reading questions. Note that things like "try to draw the other two parabolas in the picture" count as a question. ☺

Remember that what you turn in for Part I should have 3 parts, as mentioned in the syllabus:

(a) Your responses to the reading/watching questions below.

(b) Your own questions/comments on the reading.

(c) The amount of time you spent on Part I (including the time spent reading/watching).

Part II: Exercises (prepare for class Friday, February 16)

1. For each of the following, sketch an example of a function f on an interval $[a, b]$ with the listed properties or explain why such an example is impossible to give. (Recall that L_n is the left-endpoint approximation for an integral and R_n is the right-endpoint approximation.)

   (a) L_n and T_n are overapproximations for every n

   (b) R_n and T_n are overapproximations for every n

   (c) $L_n > R_n$

   (d) $L_{10} = L_{100}$

   (e) L_4 finds the *exact* area under the graph of f on $[a, b]$, but f is not constant on $[a, b]$.

   (f) T_n will find the *exact* area under the graph of f on $[a, b]$ no matter what n is, but f is not constant on $[a, b]$

Part III: Homework Problems (due Wednesday, February 21 at the beginning of class)

Review the guidelines and Sample Homework in the syllabus to make sure your Part III solutions follow them.

1. For each of the following integrals, determine what technique of integration you would use and briefly explain why you would use that technique, including a short explanation of how (e.g., if you're using integration by parts, tell me what you'd use for u and what you'd use for dv; if you're doing trig substitution, tell me what you'd use for your substitution, etc.). Note that in some places you may need to do a bit of work on the integrand before making your decision—include that work in your answer. Also, if you need to use more than one technique, that's acceptable. *You do not need to actually compute the integral for any of these, but do as much of the setup as you need to do to have a reason for your answer (and show the setup you did).*

(a) $\int x\sqrt{x^2+1}\,dx$

(b) $\int x^2\sqrt{x^2-1}\,dx$

(c) $\int \frac{x+1}{x^2+2x-8}\,dx$

(d) $\int \frac{7x+4}{x^2+2x-8}\,dx$

(e) $\int \frac{3x^2-2}{x^3-2x-8}\,dx$

(f) $\int \frac{xe^{2x}}{(1+2x)^2}\,dx$

2. Consider $\int_0^1 e^{-x^3}\,dx$. How large must n be so that the given approximation is within 0.00001 of the actual value of the integral?

(a) T_n

(b) M_n

mini-Celebration of Learning Friday, February 16

The mini-Celebration of Learning could have problems on trig substitution, partial fractions, and choosing an appropriate technique of integration for a particular integral (see Part III problem 1 on this assignment for an example of this last type of problem).